Augmented-by Addition into the ietf-yang-library

draft-lincla-netconf-yang-library-augmentdeby-01
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Overview

Background:
Augment the ietf-yang-library to provide the augmented-by list that tells the module is augmented by which other modules(refer to Fig.1).

Use Case: (draft-ietf-nmop-yang-message-broker-integration)
Improve YANG-Push receiver solution by reducing the amount of time taken to find subscribed module relationship. Integrated in libyangpush.
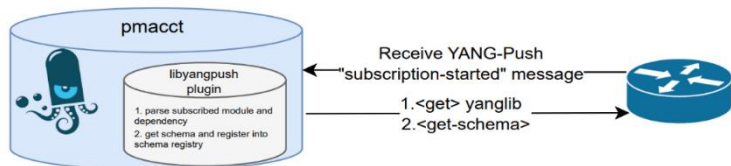

Figure 1. YANG-Push receiver diagram

```
module: ietf-yang-library
 +--ro yang-library
 | +--ro module-set* [name]
 | | +--ro name              string
 | | +--ro module* [name]
 | | | +--ro name               yang:yang-identifier
 | | | +--ro revision?          revision-identifier
 | | | +--ro namespace          inet:uri
 | | | +--ro location*          inet:uri
 | | | +--ro submodule* [name]
 | | | | +--ro name       yang:yang-identifier
 | | | | +--ro revision?   revision-identifier
 | | | | +--ro location*   inet:uri
 | | | +--ro feature*          yang:yang-identifier
 | | | +--ro deviation*            -> ../../module/name
 | | | +--ro yanglib-aug:augmented-by*   -> ../../yanglib:module/name
```

Figure 1. ietf-yang-library-augmentedby tree view

Hackathon Plan

- <What problem we are working on?>
  - The implementation for draft-lincla-netconf-yang-library-augmentdeby
  - Provide a light weight solution for finding reverse dependency (from potentially minutes to near seconds)

    This is required for closed-loop
- <How do we planned to solve it?>
  - Create an docker image for netopeer2 with the augmented-by feature
  - Implement find-dependency solution with augmented-by list

Hackathon Plan

- \<What we have improved?>
    - IETF119 Hackathon:
        - Augmentedby feature implemented with libyang and sysrepo and tested with netopeer2
    - IETF120 Hackathon:
        - Netopeer2 and related library upgraded and tested with the newest version
        - The feature implementation is wrapped using Docker
        - Integrate libyangpush find-dependency solution with augmented-by feature

What got done

Netopeer2 Docker

- To facilitate people who are interested in this feature to run and test it, a Docker for running netopeer2 and libyangpush is created.

- The augmented-by feature is integrated in the libyang and sysrepo

- By connecting to the netopeer2-server in this docker, user can query yanglib and get the augmented-by list.

What got done

Netopeer2 Docker

What got done

[Netopeer2 Docker](#)

```
> get --filter-xpath /ietf-yang-library:yang-library/module-set/module[name='ietf-interfaces']/*
DATA
<data xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <yang-library xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library">
    <module-set>
      <name>complete</name>
      <module>
        <name>ietf-interfaces</name>
        <revision>2018-02-20</revision>
        <namespace>urn:ietf:params:xml:ns:yang:ietf-interfaces</namespace>
        <location>file:///sysrepo/build/repository/yang/ietf-interfaces@2018-02-20.yang</location>
        <augmented-by xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library-augmentedby">ietf-ip</augmented-by>
        <augmented-by xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library-augmentedby">ietf-network-instance</augmented-by>
      </module>
    </module-set>
  </yang-library>
</data>
```

What got done

<u>Libyangpush find-dependency</u>

- The find-dependency solution of libyangpush is implemented to use the yanglib content to find reverse dependency

- Compared to the previous get-all-schemas solution, it can help collector reduce the time to process and get required module and dependency

What got done

Libyangpush find-dependency

What got done

Libyangpush find-dependency

```
<get xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
 <data>
   <yang-library xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library">
     <module-set>
       <name>complete</name>
       <module>
         <name>ietf-interfaces</name>
         <revision>2018-02-20</revision>
         <namespace>urn:ietf:params:xml:ns:yang:ietf-interfaces</namespace>
         <location>file:///sysrepo/build/repository/yang/ietf-interfaces@2018-02-20.yang</location>
         <augmented-by xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library-augmentedby">ietf-ip</augmented-by>
         <augmented-by xmlns="urn:ietf:params:xml:ns:yang:ietf-yang-library-augmentedby">ietf-network-instance</augmented-by>
       </module>
     </module-set>
   </yang-library>
 </data>
</get>
```

```
augmentation list size 2
deviation list size 0
augmented-by module:
ietf-ip
ietf-network-instance
```

What got done

Libyangpush find-dependency

- This avoid getting all modules to find reverse dependency.
- Get all modules is usually a heavy task. According to Cisco XR published YANG module(more than 1k)
- With this solution we shrink the processing time from minutes to milliseconds.

Wrap Up

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- **Resources:** https://github.com/Zephyre777/draft-lincla-netconf-yang-library-augmentation.git
- https://datatracker.ietf.org/doc/draft-lincla-netconf-yang-library-augmentation/
- https://github.com/network-analytics/libyangpush/tree/feature/draft_augmentedby
- https://github.com/Zephyre777/sysrepo
- https://github.com/Zephyre777/libyang

Reference:

- https://datatracker.ietf.org/doc/draft-ietf-nmop-yang-message-broker-integration/03/